

THE *CHRYSOGASTER* (*ORTHONEVRA*) *PICTIPENNIS* GROUP IN
NORTH AMERICA
(DIPTERA: SYRPHIDAE)

YALE S. SEDMAN, *Western Illinois University, Macomb, Illinois*¹

In the most recent review of the North American species of the genus *Chrysogaster* Meigen by Shannon (1916), the genus was subdivided into four easily distinguished "groups". Sedman (1964) has reviewed a portion of Group One of Shannon which includes the North American members of the genus belonging to the subgenus *Orthonevra* Macquart which exhibit sinuous eye markings.

The remainder of Group One is composed of species with a single horizontal eye stripe. There are four North American species included here, two described herein as new.

Numerous individuals and institutions have aided me in this study. I would like to thank Dr. W. W. Wirth, of the United States National Museum, for his careful notes about the type of *C. (O.) pulchella* Williston, and Mr. K. Weisman, of Western Illinois University, for his efforts in preparing the illustrations used in this work.

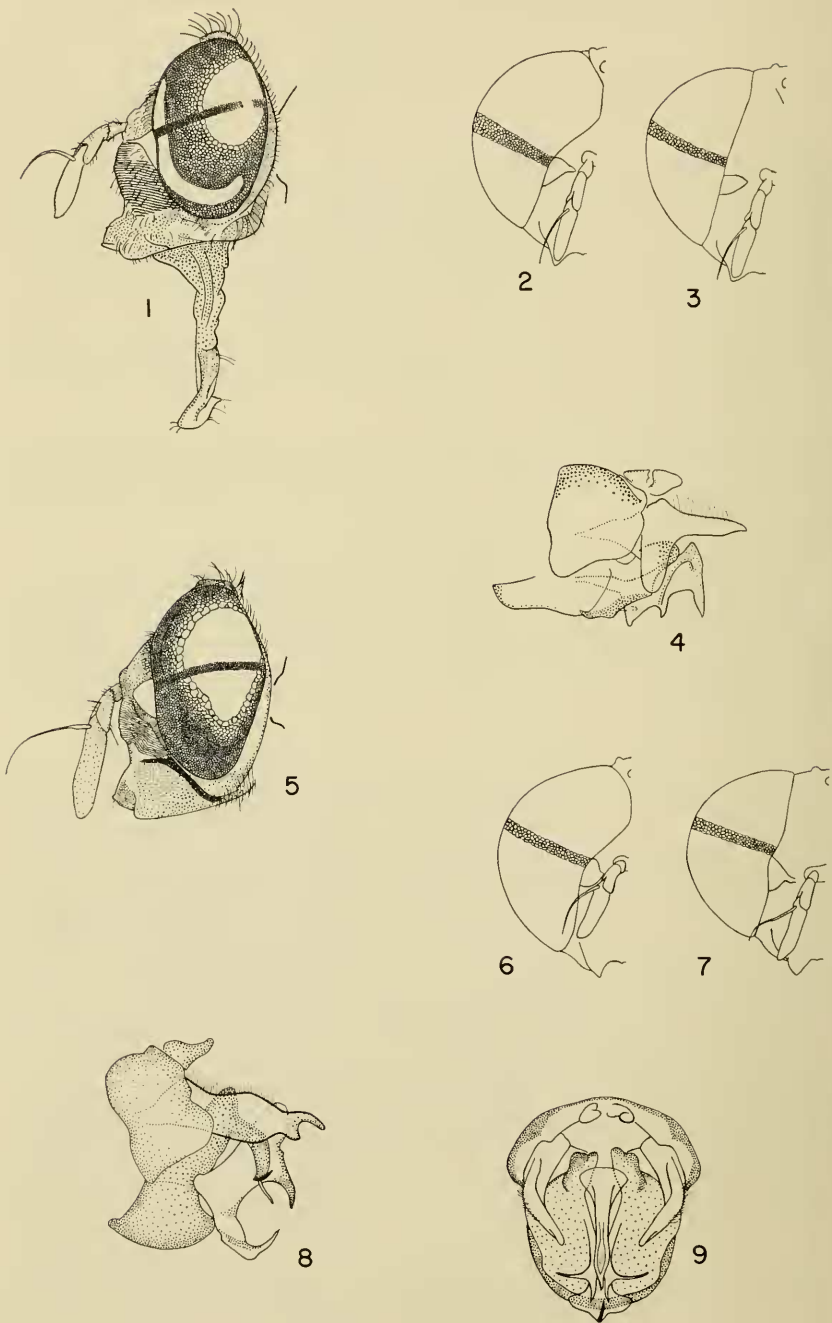
The following description will serve as a general guide to the characteristics of the *pictipennis* group. It should be kept in mind that this group, like the *bellula* group, exhibits variable reflections of purple, blue and green. These reflections may seem very distinctive, but must be used with care.

GENERAL MORPHOLOGY OF THE *pictipennis* GROUP

Head. Face black, with variable reflections; the silvery pollinose facial side spots present at about the level of antennae and eye stripe, triangular in shape; epistoma usually projecting beyond the facial bulge; roughened areas of face variable in extent, deeper laterally, forming rugae, reduced to weak striae medially; lower $\frac{1}{3}$ of face shining black or blue; cheeks shining black, often purplish; antennae elongate, first segment short, second segment variable, third segment usually $3\times$ as long as first; antennae brown or black, third segment usually lighter below; transverse eye stripe often obscure and variable in width; pile sparse and white, limited to eye margins on male front, sometimes black on ocellar triangle and upper occiput.

Thorax. Scutum with four opaque purple stripes contrasting with background which may be shining or opaque; pile short and pale; pleura black, polished, with white pile where present; wings almost evenly covered with microtrichia; squamae white to yellow; halteres yellow to brown; legs black with purplish reflections, yellow at apex of femora, and at least yellow or deep red on base and apex of tibiae, and basitarsus of fore tarsi as well as basal two tarsal segments

¹ This study was supported by a National Science Foundation Grant (GB-1336) and the Western Illinois University Research Council.



of posterior tarsi; scutellum subquadrate, similar to posterior $\frac{1}{2}$ of scutum in color and pilosity.

Abdomen. Dorsal opaque surface dilute blue, lateral shining margins black with purple and aeneous markings; distinct purple bands usually present apically on segments two, three, and four; venter shining black with blue or aeneous reflections; pile short and dark on opaque areas, white to golden pile on shining areas. Male genitalia distinctive with well developed ejaculatory hood. Female genitalia well developed.

Length. Overall length, exclusive of antennae, of males 4.5–6 mm., females 5–7 mm.

The following key will separate the species of this group known to occur in North America.

KEY TO SPECIES OF THE *pictipennis* GROUP

1. Wings hyaline or clouded, but darkened areas not isolated along crossveins 2
 Wings with cross veins clouded 3
2. All tibiae black medially; scutal pile white; face with dense white pile *pictipennis* (Loew)
 All tibiae reddish; scutal pile brown; face with sparse pile laterally *weemsi*, n. sp.
3. Scutum opaque except laterally; purple scutal stripes contrast with dilute blue background; facial pollinose spots small, not reaching $\frac{1}{2}$ distance to base of antennae; vertical pile sparse and partly black; front tibiae black medially *pulehella* Williston
 Scutum shining, the four opaque purple stripes contrast with black or deep blue background; facial pollinose spots large, almost reaching to base of antennae; vertical pile entirely white; front tibiae red or yellow, never black medially *anniae*, n. sp.

Chrysogaster (*Orthoneura*) *pictipennis* (Loew)

Orthoneura pictipennis Loew, 1863, Berlin. Ent. Zeitschr. VII: 306.

Rather than give a detailed description of this species, a list of differences and comparisons with its closest relative is presented. *C. (O.) pictipennis* is a very distinctive species and a variety of characteristics distinguish it from the only species with which it may be confused, *weemsi*, n. sp. Difficulties may be encountered, however, since the range of variation of several morphological features in *pictipennis* may result in doubts about the identity of the species.

The most satisfactory characteristic for separation of *pictipennis* from *weemsi* is the general configuration of the male genitalia (fig.

←

Figs. 1–4, *Chrysogaster* (*Orthoneura*) *pictipennis* Loew. Fig. 1, Male head; fig. 2, Male face; fig. 3, Female face; fig. 4, Male genitalia. Figs. 5–9, *C. (O.) weemsi*, n. sp. Fig. 5, Male head; fig. 6, Male face; fig. 7, Female face; fig. 8, Male genitalia, lateral view; fig. 9, Male genitalia, anterior view.

4). The nonbifurcation of the styli in *pictipennis*, as well as the ventral projection of both the ejaculatory hood and ejaculatory duct in *pictipennis*, are diagnostic features of the genitalia.

The color of the tibiae is quite distinctive and can be employed with confidence even with most teneral individuals. In *pictipennis*, the medial two-thirds of the distal surface of the tibiae is black and the basitarsus may show this same feature (the black may give the often encountered purple reflections), while in *weemsi*, the red tibiae may be darkened medially, never exhibit black or purple markings.

A characteristic with considerable utility, despite great variation, is the color of the ocellar and upper occipital pile. In specimens of *pictipennis* from the northern United States, southern Canada and west-central United States, this pile is definitely white, while in the southeastern United States, this pile is black as found in *weemsi*. The relative length of the second and third antennal segments (figs. 1, 5), exhibits a similar tendency toward clinal variation. In the northern and western range of *pictipennis*, there is a reduction in length of the second antennal segment resulting in a 1.5 : 1 ratio in extreme individuals. In the southeastern states, these segments are subequal in length and result in a ratio approximating 1.1 : 1.

The greatest difficulties in identification of this species arise when dealing with the females. Teneral females may be distinguished by the configuration of the fifth abdominal segment. In *pictipennis*, the apical margin is more deeply excavated than in *weemsi*. The female genital capsule (ninth segment) is broader and more highly sclerotized in *pictipennis*.

A number of other differences of varying utility and biological importance are worthy of mention. The front in *pictipennis* males is shining but everywhere roughened, and the central depression is very shallow. The front is not elevated above the level of the eyes and appears somewhat recessed relative to the eyes. In *weemsi*, the front is smoother, entirely shining lateral to the antennae, and is elevated so that it appears to bulge away from the eyes.

The shape of the pollinose side spots of the face is a consistent feature separating the two species. The illustrations (figs. 2, 3, 6, 7) make the differences clear.

The second antennal segment bears a variable number of black setae dorsally. As with several other characteristics, these setae seem to indicate a clinal variation. In northern areas, the number of black setae is reduced, while in the southeastern United States these setae are prominent and are present dorsally and ventrally.

The face of *pictipennis* is more extensively and more deeply rugose than that of *weemsi*. The central facial area is devoid of rugae leaving weak transverse striae in *weemsi*. The rugae cover all the central

facial area in *pictipennis* except for a transverse band above the epistomal area. The epistoma is marked with weak striae in *pictipennis* while it is polished and smooth in *weemsi*. The facial pile in *pictipennis* is longer and denser than that of *weemsi*.

Finally, *pictipennis* is a more robust species although the smallest individuals are in the size range of *weemsi*.

I have examined over 100 specimens of this rather common species from the United States and Canada. These specimens include records in the United States from Colorado, Florida, Illinois, Kansas, Maine, Massachusetts, Michigan, Minnesota, Nebraska, New York, Ohio, Pennsylvania, and Wisconsin. The distribution in Canada covers Alberta, Nova Scotia, Ontario, Quebec, and Saskatchewan. The general pattern of distribution for this species is generally skewed to the east in its southern range and gradually extended westward in its northern range.

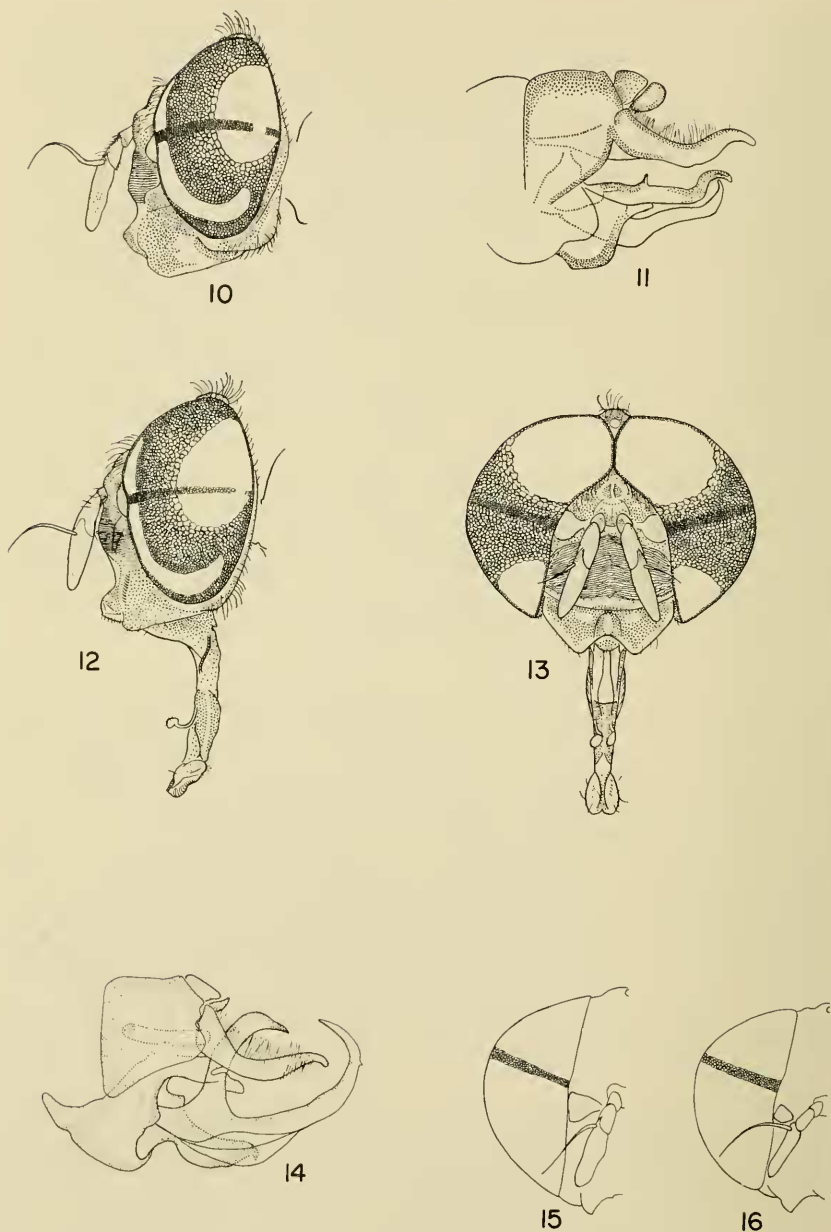
C. (O.) pictipennis raises many biological questions which are not answered by my general observations. An attempt to determine the degree of relationship between the more northern and the southeastern populations through a quantitative analysis of differences might help us in our understanding of the species.

Length. Male 5–6 mm., female 5–6.5 mm.

***C. (O.) weemsi*, n. sp.**

Male. Face shining black with bluish reflections; pollinose side spots distinctly triangular, the sides subequal in length (figs. 6, 7), approximately as long as the second antennal segment; facial pile short, sparse, and white; facial striae weakly developed and occupying less than $\frac{1}{2}$ the length of face; epistoma projecting just beyond the limit of the weak facial bulge (fig. 5). Cheeks steel-blue with sparse white pile. Antennae dark brown above, lighter below; the third segment light brown to yellow on basal $\frac{1}{2}$ or less; third segment $2\times$ the length of the second, the second segment is $2\times$ the length of the first; the brown arista slightly longer than the third segment; the first and second segments bear short black setae above, and fine white setae below. Front polished black above antennae, with a central depression; white pile present along the eye margins; front very slightly elevated above eyes in lateral view. Ocellar triangle and upper occiput with black pile.

Scutum blue with four purple stripes; surface densely punctured; medial purple stripes linear, extending $\frac{2}{3}$ the length of the scutum, lateral stripes broader, more diffuse, and extending to the level of the scutellum; pile brown, very short, sometimes lighter on posterior $\frac{1}{4}$, whitish and longer on notopleuron. Scutellum similar to scutum in color, pile yellowish to white. Pleural area polished blue. Legs black except yellowish-red tibiae and reddish-yellow basal two tarsal segments, and brown apex of third tarsal segment; pile white on dorsal and lateral surfaces of femora, hind femora black setose ventrally. Wings with dark markings on apical and posterior crossveins; sometimes indistinctly darkened on anterior



Figs. 10-11, *C. (O.) pulchella* Will. Fig. 10, Male head; fig. 11, Male genitalia. Figs. 12-14, *C. (O.) anniae*, n. sp. Fig. 12, Male head, lateral view; fig. 13, male head, anterior view; fig. 14, Male genitalia. Figs. 15-16, Female faces; fig. 15, *C. (O.) anniae*, n. sp.; fig. 16, *C. (O.) pulchella* Will.

crossvein; microtrichia evenly distributed; small medial dark cloud in first posterior cell; some or all of the crossveins with stumps of veins projecting basad. Halteres pale yellow to orange. Color of squamae variable, from pure white to yellow and brown.

Abdomen with opaque surface light blue, marked with diffuse darkened areas apically as well as broad but indistinct linear vittae on segments two and three; pile of tergum short brown and appressed; sides of abdomen and venter shining, the apices of second and third tergites usually purple and continuous with the dark areas of tergum; all pile on shining areas white. Cerci weakly lobed. Styli with distinctive bifurcation on apical $\frac{1}{2}$. Superior lobe produced ventrally, branching into two narrow spine-like structures (figs. 8, 9); ejaculatory hood very well developed dorsally with lateral swellings; ejaculatory duct directed toward apex of ejaculatory hood (fig. 8).

Female. Front rugose with indistinct longitudinal furrow. Upper $\frac{1}{4}$ of front with some black pile. Ocellar triangle and upper occiput black pilose. Basitarsi and second tarsal segments light reddish. Apex of fifth abdominal tergite transverse, weakly indented medially.

Length. Male 5 mm., female 5–6 mm.

Holotype, male, Cranberry Glades, West Virginia, 5 June 1953, H. V. Weems, Jr. Allotype, female, same data. The types are being deposited in the personal collection of Dr. Weems.

Paratypes. CONNECTICUT: Lynne, 13 May 1918, C. T. Greene, 1 female. FLORIDA: Alachua, 8 February 1955, on *Prunus angustifolia*, H. V. Weems, Jr., 1 male; 3 February 1955, on *P. angustifolia*, H. V. Weems, Jr., 1 male. Gadsden, 17 March 1958, on *P. angustifolia*, H. V. Weems, Jr., 1 male, 1 female. Gainesville, 19 March 1961, at *Viburnum rufidulum*, H. V. Weems, Jr., 1 male. NORTH CAROLINA: Southern Pines, 29 March 1910, A. H. Manee, 1 male; 22 April 1910, A. H. Manee, 1 male. NEW HAMPSHIRE: Mt. Monadnock, 11 April 1932, A. L. Melander, 1 male. NEW YORK: Babylon, Long Island, 11 May 1935, Blanton and Borders, 1 male; 9 June 1935, Blanton and Borders, 1 female; 24 May 1934, Blanton and Borders, 1 female. OHIO: Cranberry Bog, 8 June 1952, H. V. Weems, Jr., 2 males. WEST VIRGINIA: Cranberry Glades, 5 June 1952, H. V. Weems, Jr., 13 males, 5 females; 6 June 1952, H. V. Weems, Jr., 9 males; 5 June 1953, H. V. Weems, Jr., 22 males. ONTARIO (CANADA): Ottawa, 29 May 1925, C. H. Curran, 1 male.

This species bears superficial resemblance to *pictipennis* due to the clouded crossveins, the wide face, and the large pollinose facial side spots. These two species are easily separated by differences in the male genitalia, antennae, color of the tibiae, and development of the apical margin of the fifth tergite in the female. This species is limited in its distribution to eastern North America.

Chrysogaster (Orhonevra) pulchella Williston

Chrysogaster pulchella Williston, 1887, Bull. USNM 31: 35.

Male. Face shining black; facial side spots triangular, small, not extending $\frac{1}{4}$ across narrowest width of face, their upper margin at or just below lower limit of transverse eye stripe; facial pile very short, sparse, and pale, absent medially; weak ridges below side spots reduced to striae medially; shining epistoma projecting beyond weak facial bulge in profile (fig. 10). Cheeks shining black with dense, long white pile. Antennae yellowish on first and second segments distally, proximally the first segment blackish, the second segment orange; third segment orange at base ventrally, darker dorsally; first and second segments black setose apically, with pale setae below; third segment longer than second, ratio varies from 2:1 to 1.5:1; first segment short, less than $\frac{1}{2}$ the length of second. Front shining with a central depression formed by the bulging sides of the front. Ocellar triangle shining, with black pile; pile of upper occiput black.

Scutum with four purple stripes; anterior half of scutum dull blue, posterior half diffused shining bronze, purple, and/or golden; medial purple stripes with linear borders, but posteriorly fused or obscured by shining bronze reflections; lateral stripes broader, more diffuse, but often distinct to the margin of scutellum; pile short, sub-appressed, pale yellow or white. Pleurae with sparse white pile; with variable reflections although ground color black. Legs black except for narrowly yellow apex of femora and tibiae, broader basal area of tibiae, all basitarsi, and at least basal $\frac{1}{2}$ of second tarsal segment; pile pale below on posterior femora which bear coarse black setae. Wings hyaline, or rarely, broadly infuscated; microtrichia of wings evenly distributed except in the basal areas of the first and second basal and anal cells which are partially denuded. Halteres pale yellow. Squamae white.

Abdomen with opaque dorsum blackish to dilute blue, with appressed inconspicuous dark pile; pile white on lateral shining areas; side with variable reflections but often with apical purple markings on second, third, and fourth segments; pile white on shining venter except for central area of yellowish pile on third sternite. Genitalia (fig. 11) with cerci distinctly lobed; both superior and inferior lobes poorly developed; axial system with ejaculatory apex and ejaculatory opening in close juxtaposition; the opening of the ejaculatory duct is directed dorsally.

Female. Similar to male with the following differences: front with distinct longitudinal groove and two to four variable lateral rugae; frontal pile pale below, darkened dorsally, distinctly black pilose on ocellar triangle and upper occiput; facial side spots small (fig. 16), generally below level of eye stripe, often separated from level of eye stripe by width of stripe; apical margin of fifth abdominal segment moderately developed, evenly concave; genital capsule (ninth segment) well developed but not $\frac{1}{2}$ as wide as broadest width of fifth segment.

Length. Male 5-6 mm., female 5-6.5 mm.

I have examined over 300 specimens of this species. Considerable variation occurs in this species but its recognition should not be difficult. The geographic distribution is unusual in this genus. Unlike members of the *bellula* group, and most species of the *pictipennis* group, *pulchella* ranges broadly from east to west; however, I have no

records for this species from southern United States. *C. (O.) pulchella* is well represented in collections from New England and north-central United States, and is represented by a small number of individuals from South Dakota, Colorado, Utah, Idaho, Oregon and Washington. The distribution in Canada mirrors that of the United States and includes numerous representatives from the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia.

C. (O.) anniae, n. sp.

Male. Head. Face black with sparse white pile on slopes; side spots large, extending to antennae in some individuals, margin along eyes subequal in length to length of second antennal segment; face (fig. 13) with lateral weak rugae, not covering more than $\frac{1}{2}$ length of face; weak striae over middle of face; epistoma shining with short sparse pile; face weakly concave below facial bulge, epistoma projecting (fig. 12) to level of facial bulge. Cheeks black with abundant long white pile. Antennae dark brown, lighter below on third segment; second segment with black setae above, pale setae below; third segment twice as long as second, second segment twice as long as first; arista longer than third segment. Front shining black with shallow depression, bulging in profile; pile white, longer and denser than facial pile. Ocellar triangle and upper occiput white pilose, black behind eyes.

Thorax. Scutum shining blue with median two stripes dull bronze or purple, lateral pair shining on posterior $\frac{1}{2}$ or more; pile pale yellow or almost white; scutellum bluish with short pale pile. Pleurae black with aeneous reflections and white pile. Legs black, reddish with brownish stains on distal margins of tibiae, reddish yellow on basal two tarsal segments, brownish on apical three tarsal segments; pile pale except below posterior femora. Wings hyaline or infuscated; microtrichia evenly distributed over wing surface. Halteres pale yellow. Squamae white.

Abdomen. Dorsum of abdomen dark blue with brown, appressed pile; lateral shining margins bright blue with apices purple on segments two, three, and four; venter shining with white apressed pile. Genitalia (fig. 14) asymmetrical, right inferior lobe absent; ejaculatory hood and duct juxtaposed and well developed.

Female. Similar to male with the following differences: antennae with third segment orange below on basal $\frac{1}{2}$; epistoma weakly projecting, face weakly produced; pollinose side spots (fig. 15) large, extending to antennal prominence in some individuals; apex of fourth abdominal tergite produced medially into a blunt tubercle; female genital capsule (ninth segment) very well developed, more than $\frac{1}{2}$ maximum width of fifth tergite.

Length. Male 5.5–6 mm., female 5.5–6.5 mm.

This species is easily identified. It is unfortunate that in an earlier paper (Sedman, 1959), dealing with the male genitalia of the genus, that the genitalia of *anniae* were illustrated and identified as those of *pulchella*.

C. (O). anniae is a larger species than *pulchella*. The abdomen in *anniae* is more broadly polished laterally and the posterior purple markings are often lacking.

Holotype, male, Aylmer, Quebec, 23 V 1923, C. H. Curran. Allotype, female, Aylmer, Quebec, 28 V 1923, C. H. Curran. Both types are being deposited in the Canadian National Museum.

Paratypes. CONNECTICUT: Lynne, 5 May 1918, C. T. Greene, *Amelanchier canadensis*, 1 male; 6 May 1918, C. T. Greene, 1 female; 13 May 1918, C. T. Greene, 1 female. MASSACHUSETTS: Peter-sham, 9 June 1932, A. L. Melander, 1 female. MICHIGAN: Mecosta Co., 17 June 1950, R. R. Dreisbach, 1 female. Midland Co., 4 May 1943, R. R. Dreisbach, 1 female. Oscolola Co., 21 May 1939, R. R. Dreisbach, 1 male. Van Buren Co., 19 May 1959, R. and K. Dreisbach, 1 female. SOUTH DAKOTA: Custer, 19 July 1924, C. L. Fluke, 1 female. WISCONSIN: Madison, 27 April 1941, C. L. Fluke, 1 male. Tenderfoot Lake, Vilas Co., July 1912, W. S. Marshall, 1 female. MANITOBA (CANADA): 5 miles s. w. Shilo, 5 June 1958, J. F. McAlpine, 1 female. ONTARIO (CANADA): Fenelon Falls, 27 May 1927, F. P. Ide, 2 males. Guelph, 29 April 1913, C. H. Curran, 1 male. Mer Bleue, 3 June 1938, A. R. Brooks, 1 female; 10 May 1938, O. Peck, 1 male. Orillia, 30 May 1920, C. H. Curran, 1 male. Ottawa, 1 female; 1 June 1951, J. F. McAlpine, 1 male. Simcoe, 29 May 1939, G. E. Shewell, 1 female. QUEBEC (CANADA): Aylmer, 23 May 1923, C. H. Curran, 2 males; 16 May 1924, C. H. Curran, 1 female; 3 June 1924, C. H. Curran, 1 female; 23 May 1923, R. Ozburn, 1 male. Beach-grove, 17 May 1961, B. Poole, 1 male. Gatineau Park, 8 June 1954, J. F. McAlpine, 1 female. Kingsmere, 12 May 1958, J. G. Chillcott, 1 male. Queen's Park, 31 May 1928, G. A. Fisk, 1 male.

REFERENCES

- Sedman, Y. S. 1959. Male Genitalia in the subfamily Cheilosiniinae Genus *Chrysogaster*, s.l. Proc. Ent. Soc. Wash. 61: 49-58.
- . 1964. The *Chrysogaster (Orthonevra) bellula* group in North America. Proc. Ent. Soc. Wash. 66: 169-176.
- Shannon, R. C. 1916. Notes on some genera of Syrphidae with descriptions of new species. Proc. Ent. Soc. Wash. 18: 101-113.